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PATENT
Atty. Docket No. 655.00955

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of	) HEADER-LESS VEHICLE RADIATOR
	)
VIKTOR BROST et al.	) Group Art Unit: 3743
	)
Serial No.: 09/837,072	) Examiner: Tho V. Duong
	)
Filed: April 18, 2001	)

APPELLANT'S BRIEF ON APPEAL

REAL PARTY IN INTEREST

The real party in interest is Modine Manufacturing Company, the owner by virtue of an assignment recorded at reel 012222, frame 0527, of the entire right, title, and interest in and to the above application.

RELATED APPEALS AND INTERFERENCES

There are no appeals or interferences which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

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CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service, as first class mail in an envelope addressed to: Commissioner for Patents, Washington, D.C. 20231 on February 27, 2003.

Bertha Jackson

STATUS OF CLAIMS

Claims 1-13 are pending. Claims 3-10 have been withdrawn from further considerations as being drawn to a non-elected species, applicants having elected the species of Fig. 4c. Applicants note that claims 1 and 11-13 are generic. Claims 1-2 and 11 stand rejected under 35 U.S.C. 103(a) as unpatentable over Bengtsson 4,313,494 in view of Donaldson 3,265,126. Claim 12 stands rejected under 35 U.S.C. 103(a) as unpatentable over Bengtsson and Donaldson as applied to claim 11, and further in view of Potier 6,044,554. Claim 13 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Applicant's hereby appeal the October 1, 2002 final rejections and objection of claims 1,2 and 11-13.

STATUS OF AMENDMENTS

There have been no amendments filed subsequent to final rejection.

SUMMARY OF INVENTION

Appellant's invention is directed to a header-less radiator, such as that shown at 10 in Fig. 1, and a method for fabricating such a radiator. The radiator 10, as shown in Fig. 1, has a radiator core 12 defining a front face 14 and a rear face 16 thereof and including a plurality of generally rectangular shaped tubes 24 interleaved with layers of fins 26 for passage of air through the core 12. The radiator 10 also includes at least one collecting tank, such as shown at 18 in Fig. 1, that is attached to the core 12 in a fluid tight manner to provide communication between the tubes 24 and the collecting tank 18. (Specification

p. 9, lines 11-16). Each of the tubes 24 has a pair of side walls 28 extending through the core 12 and joined by a pair of end walls 30 at the front and rear faces 14 and 16 of the core 12. (Specification p. 9, lines 17-20).

The invention allows for a header-less construction by terminating each tube 24 at one end thereof in a formed segment 32 wherein the end walls 30 are bifurcated for a distance from the one end of the tube 24, with at least one of the side walls 28 being directed away from the other side wall 28 of the tube 24 to be adapted to contact a side wall 28 of an adjacent tube 24 in the core 12. (Specification p. 9, lines 20 - p. 10, line 6). The directed side wall 28 is joined in a fluid tight manner to the contacted side wall 28 of the adjacent tube 24. (Specification p. 10, lines 7-11). The collecting tank 18 has walls that extend over the front and rear faces 14 and 16 of the core 12 past the bifurcation of the end walls 30 and joined in a fluid tight manner to the end wall 30 of the tubes 24 along and beyond the bifurcation to thereby form a fluid tight joint between the walls of the collecting tank 18 and the end walls 30 of the tubes 24. (Specification p. 9, lines 12-19).

In one form, both of the side walls 28 of the tube 24 are directed away from each other to be adapted to contact an adjacent tube 24, as shown for example in Fig. 4c. (Specification p. 9, lines 24-26).

In one form of the method for fabricating the header-less radiator, a step of adapting the formed segment 32 of each of the tubes 24 is carried out after the core 12 has been assembled. (Specification p. 14, lines 17-20). In a further embodiment of the method, the step of adapting includes forming at least one of the side walls 28 in the formed segment 32 to contact a side wall 28 of an adjacent tube 24 by inserting a forming tool into the end of the tube 24 being formed. (Specification p. 14, lines 17-20).

ISSUES

1. Whether claims 1-2 and 11 are obvious under 35 U.S.C. 103(a) over U.S. Patent No. 4,313,494 to Bengtsson (hereinafter "Bengtsson") in view of U.S. Patent No. 3,265,126 to Donaldson (hereinafter "Donaldson").

2. Whether claim 12 is obvious under 35 U.S.C. 103(a) over Bengtsson and Donaldson as applied to claim 11, and further in view of U.S. Patent No. 6,044,554 to Potier (hereinafter "Potier").

GROUPING OF CLAIMS

Claims 1, 2 and 11 stand as a group. Claims 12 and13 do not stand or fall together or with any other claim.

ARGUMENT

Issue 1.

A. The rejection of claims 1, 2 and 11 as unpatentable over Bengtsson and Donaldson is improper because Bengtsson and Donaldson fail to disclose or suggest the limitation in the claims that the walls of collecting tank be **joined in a fluid tight manner** to the end walls of the tubes along and **beyond the bifurcation** of the end walls to thereby form a fluid tight joint between the walls of the collecting tank and the end walls of the tubes. *See M.P.E.P. §2143.03 and the cases cited therein* (stating that "All Claim Limitations Must Be Taught or Suggested). Indeed, taken together, Bengtsson and Donaldson teach away from such a structure. The shortcomings of the cited art are

highlighted by the Examiner's failure to acknowledge and address the "joined in a fluid tight manner" "beyond the bifurcation" limitation in any of the Office Actions to date.

More specifically, in Amendment B applicants argued that Bengtsson and Donaldson failed to disclose the recitation in claims 1 and 11 of a plurality of tubes, each having a pair of side walls joined by end walls at front and rear faces of the core, and a collecting tank having walls extending over the front and rear faces of the core past the bifurcation in the end walls of the tubes and joined in a fluid tight manner to the end walls of the tubes along and beyond the bifurcation to form a fluid tight joint between the walls of the collecting tank and the end walls of the tubes. In response to these arguments, the October 1, 2002 Final Office Action states that Donaldson teaches "having a collecting tank (10) extending past the root area, where the tube's end begins to expand into two opposite directions relative to the longitudinal axis of the tube. . . ." However, this argument by the Examiner ignores the claim language which recites the joining of the walls of the collecting tank in a fluid tight manner to the end walls of the tubes along **and beyond the bifurcation** to form a fluid tight joint between the walls of the collecting tank and the end walls of the tubes. While Donaldson does disclose walls that extend beyond the point where the ends of its tubes are expanded, it is clear from the figures in Donaldson that there is no joining of the walls of the collecting tank to the expanding portion of the tube, let alone beyond the expanding portion. Indeed, Donaldson teaches the opposite of this by providing clearance between the walls of its collecting tank and the expanding portion of its tubes and by connecting the walls of the collecting tank to the tubes only where the tubes have a uniform, i.e., non-changing, cross section. Thus, Donaldson fails to teach or suggest a fluid tight joints with the walls of a collecting tank extending beyond a bifurcation in a tube as recited in claims 1, 2 and 11.

Furthermore, as correctly acknowledged by the Examiner in the October 1, 2002 Final Office Action, Bengtsson does not disclose a collecting tank extending past the root area where the bifurcation begins. Rather, Bengtsson discloses in Fig. 4 that the edges (17) of the collecting tank are received in the waved shaped ends of the tube plates (2,3)

to be welded to the edges (11) of the plates (2,3). Indeed, Bengtsson also teaches away from the structure of claims 1, 2 and 11 by stating that shapes of the edges 11 and 17 will be "corresponding" if the edges have shapes other than waves (col. 4, lines 45-50), Thus, Bengtsson also fails to teach or suggest a fluid tight joint extending beyond a bifurcation in the tube as recited in claims 1 and 11.

Accordingly, Donaldson and Bengtsson, taken alone or in combination, fail to teach or suggest all of the limitations recited in claims 1 and 11 and their dependent claims. For this reason alone the continued rejection of these claims is improper.

B. As an additional independent basis, the rejection of claims 1, 2 and 11 as unpatentable over Bengtsson and Donaldson is improper because Bengtsson and Donaldson fail to disclose or suggest the limitation in the claims that the walls of collecting tank extend **beyond the bifurcation** of the end walls. *See M.P.E.P. §2143.03 and the cases cited therein.*

More specifically, as noted above Bengtsson fails to disclose or suggest a collecting tank having walls that extend past a bifurcation in a tube, as correctly acknowledge by the examiner in the October 1, 2002 Final Office Action. To overcome the acknowledged shortcomings of Bengtsson, the Examiner attempts to equate the non-bifurcated tubes of Donaldson to tubes that are bifurcated by stating in the October 1, 2002 Final Office Action that Donaldson teaches "having a collecting tank (10) extending past the root area, where the tube's end begins to expand into two opposite directions relative to the longitudinal axis of the tube. . . ." However, the expanded end tubes of Donaldson are clearly non-bifurcated and, accordingly, do not create the same concern for leakage at the location of the bifurcation that exists in Bengtsson, as evidenced by the lack of a liquid tight joint between the walls of the collecting tank (10) and the expanded portion of the tubes (12) in Bengtsson. Thus the tubes (12) of Bengtsson are not equivalent to the bifurcated plates (2,3) of Donaldson, and it is improper to rely on Bengtsson for a suggestion that the walls of a collecting tank should extend beyond a bifurcation in a bifurcated tube.

For this reason alone, the rejection of claims 1 and 11 and their dependent claims is improper.

Issue 2.

A. Claim 12 depends from claim 11, and for the reasons discussed above in connection with Issue 1 and claim 11, the rejection of claim 12 is improper because it relies on the same improper basis as was used in rejecting claim 11. For this reason alone, the rejection of claims 12 is improper. If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071 (Fed. Cir. 1988).

B. As an additional independent basis, the rejections of claim 12 is improper because, there is no suggestion for the desirability of modifying Bengtsson and Donaldson with the teaching of Potier, as required to establish a prima facie case of obviousness under 35 U.S.C. §103. *See M.P.E.P. §§ 2142, 2143, and 2143.01 and the cases cited in these sections.*

Claim 12 depends from claim 11 and characterizes the step of adapting one end of each of the tubes as being carried out after assembling the radiator core. As correctly acknowledged by the Examiner in the October 1, 2002, Final Office Action, Bengtsson and Donaldson fail to disclose this step. Potier is relied on by the Examiner to overcome this shortcoming of the two primary references. However, while Potier does disclose a step of expanding a tube after a step of assembling a heat exchanger core, there is nothing in Potier or the other cited references to indicate that Potier's method would be desirably applied to the cores of Bengtsson and Donaldson. Indeed, the suggestion required under 35 U.S.C. §103 is absent because Potier is directed towards a heat exchanger construction that differs significantly in at least four critical aspects from the constructions of Bengtsson and Donaldson. First, Potier is directed specifically towards tube ends (16) that are non-

bifurcated, and there is nothing in Potier to indicate that its method could be successfully employed with bifurcated tube ends such as disclosed in Bengtsson, let alone that its method would be desirable for such tubes. Second, Potier is directed specifically towards heat exchangers that include a header plate (18) through which the tube ends (16) extend, and there is nothing in Potier to indicate that its method could be successfully employed with header-less constructions such as disclosed in Bengtsson and Donaldson, let alone that its method would be desirable for such header-less constructions. Third, the tubes ends (16) in Potier are sealed to the header plate (18) by a gasket (30) after the tube ends are expanded, rather than by brazing as in Bengtsson and Donaldson, and there is nothing in Potier to suggest that it method for expanding the tube ends (16) to compress the gasket (30) would be desirable in a brazed construction that does not employ a gasket, such as in Bengtsson and Donaldson. Indeed, absent the header plate (18) and the gaskets (30), both of which are absent from Bengtsson and Donaldson, there is no reason in Potier to expand the tube ends (16). Fourth, the tubes (12) in Potier extend through plate fins (14) which must be assembled onto the tubes (12) before the tube ends (16) are expanded. This is the reason the tube ends (16) are expanded in Potier after assembly of the core. Absent the plate fins (14), there is no reason in Potier to expand the tube ends (16) after assembly of the core. Bengtsson and Donaldson do not employ plate fins. Rather, Bengtsson does not employ any fins, and Donaldson employs convoluted fins (13) that can be inserted between its tubes (12) even after the ends of the tube (12) are expanded. Thus, because no plate fins are employed, there is no need to expand the tube ends of Bengtsson and Donaldson after assembly of the core.

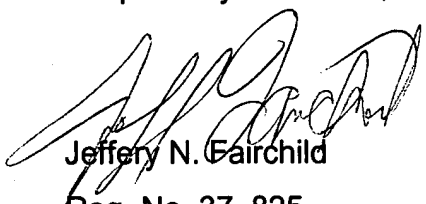
To summarize the above four critical differences, there is nothing in Potier, or the other cited references, to suggest that Potier's method for expanding its non-bifurcated tube ends (16) to compress the gasket (30) against the header plate (18) to obtain a liquid tight seal between the tube ends (16) and the header plate (18) after the tube ends (16) have been assembled through plate fins (14) would be desirable for adapting the side wall of a bifurcated tube end to contact and seal against a side wall of an adjacent bifurcated

tube end to form a header-less, brazed construction that does not employ plate fins or gaskets. Thus, Potier discloses a method for assembling a heat exchanger of a completely different type of construction from Bengtsson and Donaldson, and there is nothing to indicate that Potier's method may be desirably applied to the constructions disclosed in Bengtsson and Donaldson as asserted by the Examiner. Accordingly, the combination purposed by the Examiner is improper, and for this reason alone the rejection of claim 12 should be withdrawn.

Conclusion

In view of the foregoing, Applicants respectfully request withdrawal of the rejections of claims 1, 2, 11, and 12, and the objection to claim13 and allowance of the case.

Respectfully submitted,



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APPENDIX OF CLAIMS

1. A radiator comprising:

a radiator core defining a front and a rear face thereof and including a plurality of generally rectangular shaped tubes interleaved with layers of fins for passage of air through said core; and

a collecting tank attached to said core in a fluid tight manner to provide fluid communication between said tubes and said collecting tank;

said tubes each having a pair of side walls extending through said core and joined by end walls at said front and rear faces of said core;

said tubes each terminating at one end thereof in a formed segment wherein said end walls of each tube are bifurcated for a distance from said one end of the tube, and at least one of said side walls is directed away from the other side wall to be adapted to contact a side wall of an adjacent tube in the core;

said directed side wall being joined in a fluid tight manner to said contacted side wall of said adjacent tube;

said collecting tank having walls thereof extending over said front and rear faces of said core past said bifurcation of said end walls and joined in a fluid tight manner to said end walls of said tubes along and beyond said bifurcation to thereby form a fluid tight joint between said walls of said collecting tank and said end walls of said tubes.

2. The radiator of claim 1 wherein both side walls are directed away from each other to be adapted to contact an adjacent tube.

3. The radiator of claim 1 wherein said bifurcation is formed by a slot opening at said one end of said tube and having sides spaced by a slot width joined at said distance from one end by a smooth curve forming a rounded end of said bifurcation.

4. The radiator of claim 1 wherein said end walls include a slit of negligible width in said formed segment opening to the end of the tube to bifurcate said end wall in said formed segment, and said slit terminates at said distance from said end of the tube in a circular hole having a diameter larger than said negligible width of said slit.

5. The radiator of claim 1 wherein said side wall of said tube includes a longitudinal rib which is removed from a flattened portion of said directed side wall by compressing said flattened portion in a constrained manner such that material in said rib flows out of said flattened portion and partially into said end walls of said tube, to thereby provide flat joining surfaces of said directed side wall and said end walls to facilitate joining said directed side wall in a fluid tight manner to said contacted side wall of said adjacent tube and joining said collecting tank having walls to said end walls and joined in a fluid tight manner.

6. The radiator of claim 1 wherein said directed side wall being is attached to said contacted side wall by a compression bond in addition to being joined in said fluid tight manner to said contacted side wall of said adjacent tube.

7. The radiator of claim 1 wherein said end walls are bifurcated in an asymmetrical manner with respect to said side walls with a larger portion of said bifurcated end wall joined to a first one of said side walls, and a smaller portion of said bifurcated end wall joined to the second side wall of said tube, and only said second side wall being directed and joined to said contacted side wall of said adjacent tube.

8. A radiator comprising:

a radiator core defining a front and a rear face thereof and including a plurality of generally rectangular shaped tubes interleaved with layers of fins for passage of air through said core; and

a collecting tank attached to said core in a fluid tight manner to provide fluid communication between said tubes and said collecting tank;

said tubes each having a first and a second side wall extending through said core and joined by end walls at said front and rear faces of said core;

said tubes each terminating at one end thereof in a formed segment wherein said end walls of each tube include a first bifurcation for a first distance from said one end of the tube, and a second bifurcation for a second distance from said one end of the tube, with a first portion of said end wall joined for said first distance only

to said first side wall, a second portion of said end wall joined for said second distance only to said second side wall, and a central portion of said end wall not joined to either said first and second portions of said end wall for said first and second distances respectively;

said first and second side walls are adapted to contact a side wall of an adjacent tube in the core;

said adapted side wall being joined in a fluid tight manner to said contacted side wall of said adjacent tube;

said collecting tank having walls thereof extending over said front and rear faces of said core past said first and second bifurcations of said end walls and joined in a fluid tight manner to said end walls of said tubes along and beyond said first and second bifurcations to thereby form a fluid tight joint between said walls of said collecting tank and said end walls of said tubes.

9. The radiator of claim 8 wherein at least one of the first and second bifurcations terminate in a smooth curve.

10. The radiator of claim 8 the first and second distances are equal.

11. A method for fabricating a header-less radiator comprising:

fabricating a plurality of tubes, each having a generally rectangular cross section comprised of a pair of spaced side walls joined by a pair of end walls;

adapting one end of each of said tubes to provide a formed segment having said end walls bifurcated for a distance from said one end and at least one side wall in said formed segment adapted to contact and seal against a side wall of an adjacent one of said tubes when said tubes are joined together in an interleaved configuration with layers of fin to form a radiator core;

assembling a radiator core in a manner defining a front and a rear face thereof and including said plurality of generally rectangular shaped tubes interleaved with layers of fins for passage of air through said core;

said side walls of said tubes extending through said core with said end walls at said front and rear faces of said core; and with said adapted side walls in said formed segments of said tubes contacting a side wall of an adjacent tube in the core;

joining each said adapted side wall in said formed segments in a fluid tight manner to said contacted side wall of said adjacent tube;

attaching a collecting tank having walls thereof extending over said front and rear faces of said core past said bifurcation of said end walls; and

joining said collecting tank in a fluid tight manner to said end walls of said tubes along and beyond said bifurcation to thereby form a fluid tight joint between said walls of said collecting tank and said end walls of said tubes.

12. The method of claim 11 wherein the step of adapting one end of each of said tubes is carried out after assembling said radiator core.

13. The method of claim 12 wherein the step of adapting includes forming at least one of said side walls in said formed segment at said one end of said tubes to contact a side wall of an adjacent tube in said core by inserting a forming tool into said one end of each of said plurality of tubes.